

60. The method of claim 59, wherein the fluorescent dye is a SYBR green dye.

61. The method of claim 46, wherein the molecule is selected from the group of biotin, biotin-4-fluorescein, fluorescein biotin, avidin, streptavidin, and neutravidin.

62. A method of determining the thermal inertia of a microfluidic device, the method comprising:

flowing a fluid comprising a fluorescent material through a channel in a microfluidic device, wherein the amount of fluorescence generated by the fluorescent material varies with temperature,

varying the temperature of an external surface of the microfluidic device, wherein the variation comprises a pattern with a recognizable feature, wherein the variation in temperature of the external surface produces a corresponding variation in temperature within the channel, and wherein the variation in temperature in the channel produces a corresponding variation in the amount of fluorescence generated by the fluorescent material,

measuring the fluorescence generated by the fluorescent material in the channel, and

determining a time offset between the temperature variations of the external surface and the variations in the amount of fluorescent by measuring the time delay between the imposition of the recognizable feature on

the external surface and the appearance of the recognizable feature in the fluorescence generated by the fluorescent material, whereby the time offset is indicative of the thermal inertia.

63. The method of claim 62, wherein the pattern is a sine wave.

64. The method of claim 63, wherein the recognizable feature is a maximum in the sine wave.

65. A method of determining whether the fluid in a microchannel is flowing or stagnant, the method comprising:

applying a range of driving forces to cause fluid to flow through a microchannel at a range of flow rates, wherein the fluid comprises a fluorescent material, and wherein the range of flow rates includes a zero flow rate,

exciting the fluorescent material with light of a sufficient intensity to photobleach the fluorescent material,

measuring the amount of fluorescence emanating from the fluorescent material in the microchannel at a plurality of flow rates in the range of flow rates,

determining the flow rate at which the amount of fluorescence emanating from the fluorescent material is minimized, whereby that flow rate is the zero flow rate.

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